

What is claimed is:

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1. An aqueous external dispersion useful as a crystal modifier for petroleum or a petroleum-derived liquid, comprising a wax dispersant and an organic crystal modifier composition dispersed through a continuous water phase, the wax dispersant being present in the dispersion in an amount sufficient to impart at least meta-stability to the dispersion, and the dispersion having a viscosity at 25°C of less than about 50,000 centipoise.

2. An aqueous external dispersion as set forth in claim 1 wherein the dispersion has a viscosity at 25°C of from about 5,000 centipoise to about 15,000 centipoise.

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3. An aqueous external dispersion as set forth in claim 1 having a density less than 1 gm./cm<sup>3</sup> and greater than the petroleum or petroleum-derived liquid.

4. An aqueous external dispersion as set forth in claim 3 having a density greater than about 0.75 gm./cm<sup>3</sup>.

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5. An aqueous external dispersion as set forth in  
claim 1 wherein the dispersant comprises a non-ionic  
surfactant selected from the group consisting of  
ethoxylated hydrocarbons having a carbon chain of at  
5 least about eighteen carbon atoms in length and  
ethoxylated hydrocarbons of shorter chain length,  
provided however that if the non-ionic surfactant is an  
ethoxylated hydrocarbon of shorter chain length, the  
dispersant further comprises an ionic surfactant in an  
10 amount such that the dispersant has an HLB of from about  
6 to about 18.

6. An aqueous external dispersion as set forth in  
claim 1 wherein the dispersant is an ethoxylated  
aliphatic alcohol having a backbone of number average  
15 length of about 20 to about 50 carbon atoms ethoxylated  
with ethylene oxide in a weight ratio of ethylene oxide  
to the backbone of approximately 1:0.5 to approximately  
1:2.

7. An aqueous external dispersion as set forth in  
20 claim 5 wherein the dispersant is a combination of (a)  
nonylphenol ethoxylated in an ethylene oxide to  
nonylphenol molar ratio of approximately 4:1, and (b)  
dodecylbenzylsulfonic acid, in a proportion of (a) to (b)  
sufficient to produce an HLB of the combination of about  
25 6 to about 18.

8. An aqueous external dispersion as set forth in claim 5 wherein the dispersant is a non-ionic ethoxylated hydrocarbon surfactant having a carbon chain of at least about eighteen carbon atoms in length.

5 9. An aqueous external dispersion as set forth in claim 1 wherein the organic crystal modifier composition comprises an olefin/maleic anhydride copolymer having weight average molecular weight of from about 3,000 to about 10,000.

10 10. An aqueous external dispersion as set forth in claim 9 wherein the copolymer is of an acid, diacid, ester, diester, acid/ester, anhydride, amide or imide form, or a combination thereof.

15 <sup>SUB</sup> 11. An aqueous external dispersion as set forth in ~~D2~~ claim 10 wherein the organic crystal modifier composition further comprises an aromatic hydrocarbon solvent.

20 12. An aqueous external dispersion as set forth in claim 1 wherein the organic crystal modifier composition comprises an olefin/maleic anhydride copolymer having weight average molecular weight of from about 3,000 to about 10,000.

13. An aqueous external dispersion as set forth in claim 9 wherein the crystal modifier is also a paraffin deposition inhibitor.

14. An aqueous external dispersion as set forth in claim 1 wherein the organic crystal modifier composition is dispersed in the form of particles having a weight average particle size of up to about 50 microns.

5       15. An aqueous external dispersion as set forth in claim 1 further comprising at least one other agent selected from the group consisting of oil soluble corrosion inhibitors, scale inhibitors, asphaltene inhibitors, bactericides and freezing point depressants.

10       16. An aqueous external dispersion as set forth in  
SUN D3P claim 11 wherein the dispersion contains from 0 to about 50% aromatic hydrocarbon solvent.

15       17. A method for crystal modification of petroleum or a petroleum-derived liquid, comprising adding to the petroleum or petroleum-derived liquid an aqueous external dispersion as set forth in claim 1.

20       18. A method as set forth in claim 17 wherein the dispersion is added to the petroleum or petroleum-derived liquid as a batch treatment and the dispersion releases the crystal modifier composition to the petroleum or petroleum-derived liquid continuously over an extended period of time.

25       19. A method as set forth in claim 17 wherein the dispersion has a viscosity at 25°C of from about 5,000 centipoise to about 15,000 centipoise.

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20. An aqueous external dispersion as set forth in claim 17 having a density less than 1 gm./cm<sup>3</sup> and greater than the petroleum or petroleum-derived liquid.
21. An aqueous external dispersion as set forth in claim 17 wherein the dispersant is a combination of surfactants.
22. An aqueous external dispersion as set forth in claim 17 wherein the dispersant is an ethoxylated aliphatic compound having a backbone number average length of about 20 to about 50 carbon atoms ethoxylated with ethylene oxide in a weight ratio of ethylene oxide to the backbone of approximately 1:0.5 to approximately 1:2.
23. An aqueous external dispersion as set forth in claim 21 wherein the dispersant is a combination of (a) nonylphenol ethoxylated in an ethylene oxide to nonylphenol molar ratio of approximately 4:1, and (b) dodecylbenzylsulfonic acid, in a proportion of (a) to (b) sufficient to produce an HLB of the combination of about 6 to about 18.
24. An aqueous external dispersion as set forth in claim 17 wherein the organic crystal modifier composition comprises an olefin/maleic anhydride copolymer having weight average molecular weight of from about 3,000 to about 10,000.

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25. An aqueous external dispersion as set forth in  
Claim 9 wherein the copolymer is of an acid, diacid,  
ester, diester, acid/ester, anhydride, amide or imide  
form, or a combination thereof.

5           26. An aqueous external dispersion as set forth in  
SUB claim 25 wherein the organic crystal modifier composition  
①④ further comprises an aromatic hydrocarbon solvent. *method*

10          27. An aqueous external dispersion as set forth in  
claim 26 wherein the dispersant comprises a non-ionic  
surfactant selected from the group consisting of  
ethoxylated hydrocarbons having a carbon chain of at  
least about eighteen carbon atoms in length and  
ethoxylated hydrocarbons of shorter chain length,  
provided however that if the non-ionic surfactant is an  
15         ethoxylated hydrocarbon of shorter chain length, the  
dispersant further comprises an ionic surfactant in an  
amount such that the dispersant has an HLB of from about  
6 to about 18.

20          28. An aqueous external dispersion as set forth in  
claim 24 wherein the crystal modifier is also a paraffin  
deposition inhibitor. *method*

25          29. An aqueous external dispersion as set forth in  
claim 17 wherein the organic crystal modifier composition  
is dispersed in the form of particles having a weight  
average particle size of up to about 50 microns. *method*

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30. An aqueous external dispersion as set forth in claim 17 further comprising at least one other agent selected from the group consisting of oil soluble corrosion inhibitors, scale inhibitors, bactericides, asphaltene inhibitors and freezing point depressants.

31. An aqueous external dispersion as set forth in

claim 26 wherein the dispersion contains from 0 to about 50% aromatic hydrocarbon solvent.

32. A method for treating an oil well for crystal modification of petroleum in the oil well, the oil well having an annulus, comprising adding through the annulus of the well a batch of an aqueous external dispersion as set forth in claim 1, and flushing the dispersion to a desired location in the well for extended crystal modification of the petroleum in the oil well.

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33. A method for preparation of an aqueous external dispersion useful as a crystal modifier for petroleum or a petroleum-derived liquid, comprising:

5 combining and heating a wax dispersant and an organic crystal modifier composition to form an organic phase, the dispersant comprising a non-ionic surfactant, to form a liquid organic phase; and then

10 adding the liquid organic phase to water at a rate of addition and with sufficient agitation and with the water at a temperature to disperse the organic phase throughout the water in an organic phase weight average particle size of less than about 10 microns;

15 thereby to produce a dispersion comprising the dispersant and the organic crystal modifier composition dispersed through a continuous water phase the dispersion having a viscosity at 25°C of less than about 50,000 centipoise.

